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(54) Title: ARRAY OLIGOMER SYNTHESIS AND USE.

(57) Abstract: The present disclosure provides efficient and reproducible methods for individually synthesizing oligomers in a parallel manner (e.g., oligonucleotides) on a solid support to produce pools of oligomers. Pools of oligonucleotides can be used for a variety of genomic and proteomic applications, including synthesis of genes or long DNA of any arbitrary sequence, PCR template amplification, and to generate primers for multiplexing PCR or transcription. Rapid availability of these oligonucleotide products will greatly accelerate the processes of de novo protein design, vaccine development, production of short RNA fragments, such as siRNA, oligonucleotide-based drug screening, and SNP sample preparation.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/34207

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12Q 1/68; C07H 1/00; G01N 33/53  
 US CL : 435/ 6, 7.1, 91.2; 422/129, 134; 536/23.1, 23.2, 24.33, 25.3

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/ 6, 7.1, 91.2; 422/129, 134; 536/23.1, 23.2, 24.33, 25.3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,083,697 A (BEECHER et al.) 4 July 2000 (04.07.2000), see entire patent.	1-8 and 11-14
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Y		15-27
X	US 6,426,184 B1 (GAO et al.) 30 July 2002 (30.07.2002), see entire patent.	1-14
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Y		15-37
Y	WO 99/07888 A1 (CHURCH et al.) 18 February 1999 (18.02.1999), see entire document.	15-27
Y,P	WO 03/057924 A1 (GASCOYNE et al.) 17 July 2003 (17.07.2003), see entire document.	15-27
Y	DEBEAR et al., "A Universal Glass Support For Oligonucleotide Synthesis", Nucleosides and Nucleotides. 1987, Vol. 6, No. 5, pages 821-830, see entire article, especially pages 822 (1st full paragraph) to page 824.	23, 30
Y	WO 01/75164 A2 (TUSCHL et al.) 11 October 2001 (11.10.2001), see entire document.	28-33

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

22 November 2004 (22.11.2004)

Date of mailing of the international search report

15 DEC 2004

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## INTERNATIONAL SEARCH REPORT

## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,110,709 A (AUSABEL et al.) 29 August 2000 (29.08.2000), see entire patent.	34-37

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US03/34207

**Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)**

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claim Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claim Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claim Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Continuation Sheet

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest     The additional search fees were accompanied by the applicant's protest.  
                        No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**

PCT/US03/34207

**BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING**

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-14, drawn to a method for parallel syntheses of an array of multimers.

Group II, claim(s) 15-27, drawn to a method of generating a DNA sequence.

Group III, claim(s) 28-33, drawn to a method of generating a library of short RNA molecules.

Group IV, claim(s) 34-36, drawn to a method of large-scale SNP detection.

Group V, claim(s) 37, drawn to a method of generating an oligonucleotide library.

**Continuation of B. FIELDS SEARCHED Item 3:**

West: PGPB, USPT, USOC, EPAB, JPAB, DWPI, TDBD  
STN: CAPLUS, EMBASE, BIOSIS, MEDLINE, WPIDS